Using Propane-Fired Cannons to Keep Birds Away from Vineyards

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Factsheet

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Replaces OMAFRA Factsheet 09-001, *Using Propane-Fired Cannons to Keep Birds Away From Vineyards*

INTRODUCTION

Bird damage is a problem in all grape-growing areas of the world. Most agree the problem is worsening as more hectares of cultivars are grown. Damage begins around veraison when grapes start to colour, signifying change from growth to ripening and the accumulation of sugars. Damage continues until harvest in early fall or winter with grapes harvested for ice-wine. A field trial (Fraser, 2005) showed with no bird controls, losses were 50 per cent for Cabernet Franc and 100 per cent for Cabernet Sauvignon by late October. Although birds prefer blue/red French hybrids and red Vinifera grapes damage is reported in all cultivars.

BIRD CONTROL STRATEGIES

There are many bird control strategies: visual (streamers, balloons, lights, fake hawks); physical (nets), and acoustical deterrents (electronic sound devices, pyrotechnic pistols). Experts agree a combination of methods is required.

One acoustical option is a propane-fired, bird-scaring cannon —also known as a bird banger — that emits cannon like sounds (Figure 1). Over 80 countries use bird bangers to control crop damage (Frensch, 2008). A five year Manitoba study concluded bird bangers were very effective for scaring birds away from field corn and sunflowers. Double-firing bird bangers were found to protect more than twice the area of a single-firing one. Today most bird bangers are triple-firing ones that are even more effective.

Some neighbours do not like the sound from bird bangers. Paradoxically, grapes are grown near many neighbours since people like living near vineyards. Neighbours need to be tolerant of growers who use bird bangers as there is only a small area of Ontario with favourable growing conditions. Likewise, growers need to be tolerant of neighbours' needs.

This Factsheet outlines best management practices (BMP) for bird bangers. It is written for grape growers, neighbours, municipal by-law officers, members of the Normal Farm Practices Protection Board under the *Farming and Food Production Protection Act (FFPPA) 1998* and government agencies dealing with nuisance noise issues.

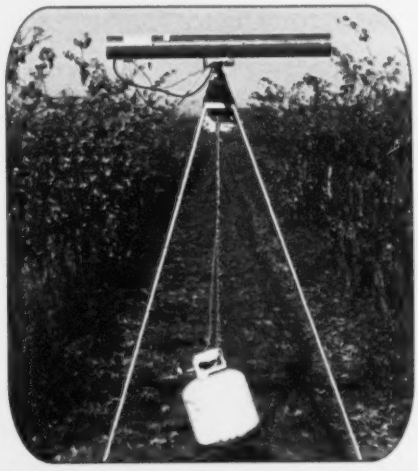

Figure 1. This side view of a bird banger shows the cylindrical barrel at top, open on one end (right side in photo), control system box (top, back), tripod and tank of propane gas.

NORMAL FARM PRACTICE AND FFPPA

If they follow *normal farm practice* farmers are protected from nuisance noise complaints by neighbours in accordance with the *Farming and Food Production Protection Act (FFPPA) 1998*. The legislation defines normal farm practice as one which:

- is conducted in a manner consistent with proper and acceptable customs and standards, as established and followed by similar agricultural operations under similar circumstances or
- makes use of innovative technology in a manner consistent with proper advanced farm management practices

Normal farm practice is determined by the Normal Farm Practices Protection Board, which is a quasi-judicial administrative board appointed by the provincial government but comprised of non-government members. For information see www.omafra.gov.on.ca/english/engineer/nfppb/nfppb.htm.

Ministry of Agriculture, Food and Rural Affairs

Ontario

BEST MANAGEMENT PRACTICES (BMPs)

The principle for best management practices for bird bangers is that their only use is to protect bearing, marketable grapes from bird predation. The number of bird bangers operated should be appropriate for the amount of bird pressure present. ***Malicious use for any other purpose must not be tolerated.***

1. Follow recommended setbacks for bird bangers to neighbours' homes based on ring-graph method on management strategies (Figure 2) (see *Determining Minimum Setbacks*).

2. Tell neighbours living within 175 m (575 ft) of bird bangers about when and how they will be operated and who to call if there is a problem.

3. Start operating bird bangers no earlier than three to four weeks prior to veraison and stop right after harvest. ***Do not operate outside this season.***

4. Operate bird bangers during daylight hours, between 30 minutes before local sunrise and 30 minutes after local sunset. See Table 1. ***Do not operate bird bangers at night in your vineyard.***

5. Place adjacent bird bangers no closer than 125 m (410 ft) to each other, unless the area of crop being protected is less than about 4 ha (9.9 ac), in which case place them no closer than 100 m (328 ft) as smaller properties are often awkwardly shaped. To calculate hectares of grapes needing protection include just the area of land currently of crop-bearing age and marketable in the current year.

6. Adjust timers to account for changes in sunrise and sunset times throughout the season especially at Daylight Savings Time if bird bangers are still necessary beyond this date until harvest (Table 1).

7. Where practical, move bird bangers weekly so birds do not get used to their location.

8. Do not place bird bangers within a grape row directly in line with a neighbour's house, as the row canopy can channel the sound towards the house.

9. Monitor bird bangers so they operate properly, especially those not on, or near, your home farm.

10. Take into account echoing when using bird bangers adjacent and below or on the Niagara Escarpment, as it can cause echoing.

11. Use light sensor over-ride devices to ensure bird bangers cannot operate at night, even if timers are adjusted improperly, especially on properties where the vineyard manager lives off-site.

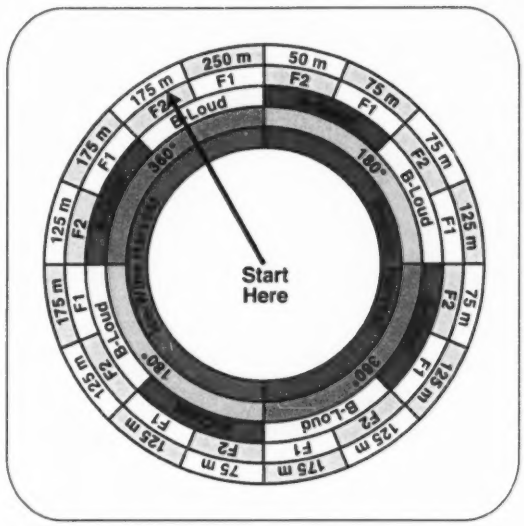

Figure 2. Ring-graph used to determine bird banger setbacks to neighbours based on management strategies.

DETERMINING MINIMUM SETBACKS TO NEIGHBOURS' HOMES

It is impractical to create setbacks based on site-specific measured sound levels in decibels (dBA) from every bird banger. The emitted sound level is the same as it leaves the barrel of a bird banger, but it varies greatly after release depending on localized weather conditions, wind speed and direction, topography, ground cover, direction of firing, obstructions like buildings, etc.

Under most circumstances, the BMP setback is 125 m (410 ft) from neighbours for normal operation of a bird banger when it is operated:

- during the *regular* grape season, ceasing about the end of October (**not** the extended season for ice wine, which could go well into winter some years)
- with proper levelling of the bird banger so it spins uniformly 360° in all directions (**not** when set to fire only in 180° plane away from a neighbour's home)
- with the '*B–loud volume*' setting (**not** the '*A–quiet volume*' setting, available on some bird bangers)
- on *Frequency 2* setting (4 to 8min. sequence interval (**not** *Frequency 1*, 2 to 4 min. interval)

Table 1. Start/Stop Times for Operating Bird Bangers

Earliest start times (30 min. before sunrise) and latest stop times (30 min. past sunset) for bird bangers through typical veraison to regular or ice wine harvest dates.

	Vineland W79°24', N43°09'		Harrow W82°52', N42°02'		Wellington W77°14', N44°00'	
Dates	*a.m. Start*	*p.m. Stop*	*a.m. Start*	*p.m. Stop*	*a.m. Start*	*p.m. Stop*
1 Aug	5:39	9:09	5:55	9:20	5:28	9:02
8 Aug	5:46	9:00	6:02	9:11	5:35	8:53
15 Aug	5:54	8:49	6:10	9:01	5:43	8:42
22 Aug	6:01	8:38	6:17	8:51	5:51	8:31
29 Aug	6:09	8:27	6:24	8:39	5:59	8:19
5 Sep	6:17	8:15	6:32	8:28	6:07	8:07
12 Sep	6:24	8:02	6:39	8:15	6:15	7:54
19 Sep	6:32	7:50	6:46	8:03	6:23	7:41
26 Sep	6:40	7:37	6:54	7:51	6:31	7:28
3 Oct	6:48	7:24	7:01	7:39	6:39	7:15
10 Oct	6:56	7:12	7:09	7:27	6:48	7:03
17 Oct	7:04	7:01	7:17	7:16	6:57	6:51
24 Oct	7:13	6:50	7:25	7:06	7:06	6:40
31 Oct	7:22	6:40	7:34	6:56	7:15	6:30
Daylight savings time changes first Sunday in November						
7 Nov	6:31	5:31	6:42	5:48	6:24	5:21
14 Nov	6:40	5:24	6:51	5:41	6:33	5:13
21 Nov	6:48	5:18	6:59	5:35	6:42	5:07
28 Nov	6:57	5:15	7:07	5:32	6:51	5:03
5 Dec	7:04	5:13	7:15	5:30	6:58	5:01
12 Dec	7:11	5:13	7:21	5:30	7:05	5:01
19 Dec	7:15	5:15	7:26	5:32	7:10	5:03
26 Dec	7:18	5:19	7:29	5:36	7:13	5:07

The 125 m (410 ft) setback is based upon field sound level measurements at varying distances from a bird banger and under different bird banger settings. Other setbacks also make sense if practices are used that *increase* sound levels (requiring *greater* setbacks), or *decrease* sound levels (requiring *lesser* setbacks).

Field tests by the author explored setbacks based on different settings than those outlined above (Figure 2). Sound levels and annoyance for neighbours are:

- *increased* if the harvest season is extended for ice wine, as no vegetation is present to muffle sounds and the long season extends the annoyance period. This effectively *adds* 5 dBA compared to regular season use.

- *reduced* if a bird banger is physically prevented from firing directly at or within the 180° plane of home(s). This can be accomplished using springs or stops. This effectively *drops* sound levels 5 dBA compared to bird bangers that can fire in all directions, including sometimes in the direction of home(s).

- *reduced* if the bird bangers are set on the *'A–quiet volume'* setting, which effectively *drops* sound levels 5 dBA compared to the *'B–loud volume'* setting (Figure 3)

- *increased* if bird bangers are set on the faster Frequency 1 (2 to 4 min.) sequence interval, which effectively *adds* 5 dBA compared to Frequency 2 sequence interval (4 to 8 min.) (Figure 3) (Note: Few grape growers operate bird bangers on Frequency 3 (8 to 16 min.) or Frequency 4 (16 to 32 min.) because the firing interval is too long.)

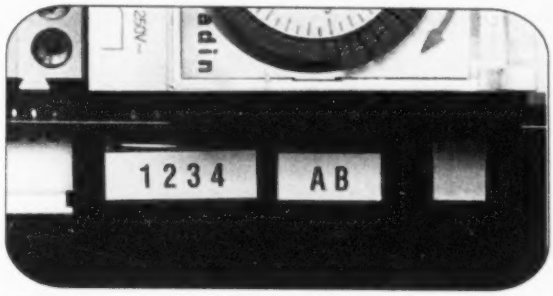

Figure 3. '1' = Frequency 1 (2–4 min.); '2' = Frequency 2 (4–8 min.)'3' = Frequency 3 (8–16 min.) '4' = Frequency 4 (16–32 min.) 'A' is quiet volume sound setting; 'B' is loud volume setting.

Example:
A grower with ice-wine grapes fires a bird banger in all directions on 'B–loud volume' setting, with Frequency 2 (4–8 min.) firing sequence. Using Figure 2, what setback is recommended to neighbours' homes?

- Enter Figure 2 from centre, moving through layers: **Ice-Wine Harvest; 360°** (meaning bird banger fires in all directions); **B-Loud**; and **F2** (4–8 min.) to a ***175 m*** setback.
- To reduce the setback to 125 m, one could set the bird banger on **A-Quiet** *or* restrict it to fire only in the **180°** plane away from a neighbouring home.

HOW BIRD BANGERS WORK

Bird bangers have a cylindrical barrel about 100 mm (4 in.) in diameter and 0.8 m (32 in.) in length open at one end, a spark plug, a 9 kg (20 lb) tank of propane gas, valves and a control system. When activated, a valve lets propane gas into the barrel that is ignited by the spark plug. An explosive sound is created, blown out the barrel's open end.

To spin uniformly in all directions, most bird bangers are mounted on a tripod with one adjustable leg to level it. Triple-firing bird bangers produce a series of three shots over about 17 seconds — the first startles birds, the second drives them away, and the third makes sure they will not return. The momentum from the shots causes the barrel to recoil and spin away from the direction of emitted sound (Figure 4).

Tests by the author show if properly levelled, a bird banger will fire in all directions over time, although wind speed and direction can affect final pointing direction. If bird bangers are not level they will fire more often in one direction than another, and this is a problem if it is at a neighbour's home. The frequency of random firing can be adjusted to one set of 3 firings every 2 to 4, 4 to 8, 8 to 16 or 16 to 32 min. (Figure 3). On the 4 to 8 minute frequency setting, expect sequences to average about every six minutes. Randomness keeps birds wondering when the next firings will occur and prevents them from growing accustomed to them. Figure 5 shows how to set the timer mechanism in the control system box.

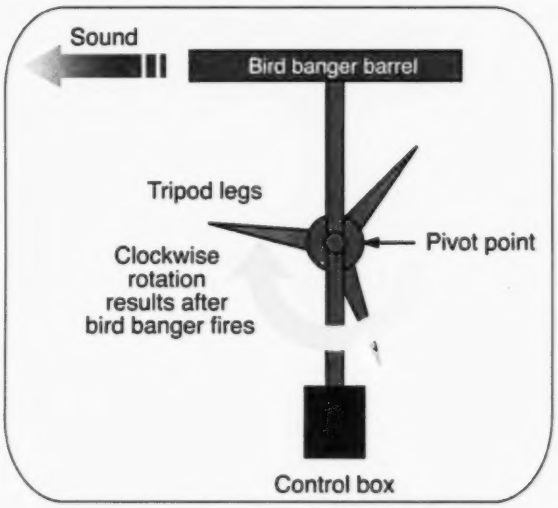

Figure 4. This overhead view shows as sound waves exit a bird banger barrel it causes recoil, turning it clockwise. Tests show it can spin up to 10 times before stopping.

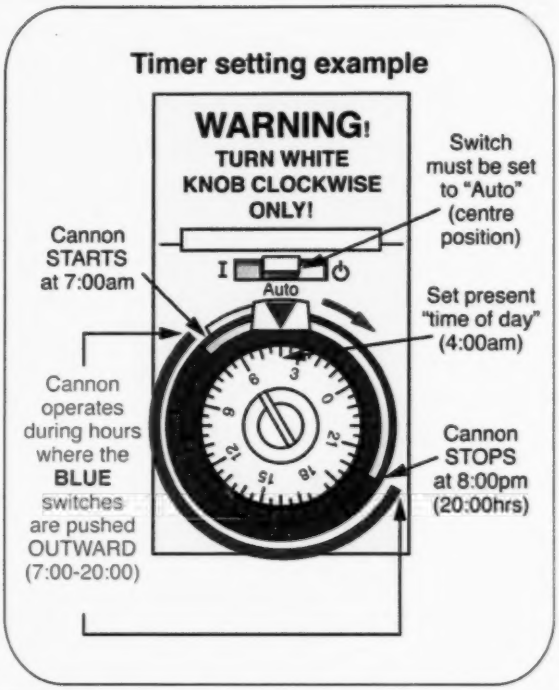
Timer setting example
WARNING!
TURN WHITE KNOB CLOCKWISE ONLY!
Switch must be set to "Auto" (centre position)
Cannon STARTS at 7:00am
Auto
Set present "time of day" (4:00am)
Cannon operates during hours where the BLUE switches are pushed OUTWARD (7:00-20:00)
Cannon STOPS at 8:00pm (20:00hrs)

Figure 5. Inside a bird banger control system box, an operator can adjust when a bird banger starts in the morning and stops in the evening. The setting shown is appropriate for September 26 at Harrow as per Table 1.

REFERENCES

Fraser, H.W. 2005. *Presentation at Ontario Fruit and Vegetable Conference,* February 2005.

Frensch, I. 2008. *Personal Communication,* July 22.

Harris, H.A.G. 1983. *Blackbird Predation on Field Crops in Southern Manitoba. Summary from Annual progress report on the AGRO-MAN (Central Plains Special Crops Protection Association) Blackbird Control Project.*

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